

REMARKS

Applicant respectfully requests reconsideration of the rejection of claims 1, 2, 5, 15, 18 and 28, as previously presented and, in the case of claims 2, 18 and 28, amended without the addition of new matter. Claims 29 and 30 have been allowed but claims 29 and 30 have been editorially amended at a few points for clarity.

The rejection of claims 1, 2, 5 and 15 under 35 USC, sections 102 and 103 respectively is respectfully traversed, and the rejection of claims 18 and 28 as vague and indefinite under 35 USC §112 (these claims otherwise being allowable) has been attended to by the elimination of the wording pertaining to “API specifications”.

Claim Objections

Claim 18 is objected to because of the reference to “end plane”, which has now been amended to end face plane at line 9, as correctly assumed by the Examiner to have been intended.

Rejection under 35 USC §112

Para. 6 of the Office action, starting on p. 3, rejects claims 18 and 28 because of reference to “API” or “manufacturer’s specifications”, and suggests that further material be provided as to the specifications and that the term be more specifically defined.

Applicant had assumed that, given the virtually universal acceptance of API specifications in oil field practice and patent specifications, it would be well understood that this is not a controversial reference. However, it appears from the interchanges that have taken place that this assumption was not justified. Moreover, it was wholly unnecessary to refer to any particular specifications, inasmuch as it is well understood that sucker rods can meet different specifications as to size, material properties, design variations, and the like. What is important is that all sucker rods in a string be

interconnectable and that they each meet certain minimum specifications so that a string of sucker rods, which may extend for several miles into a deep well, will be without weak links anywhere in the string. Accordingly claims 18 and 28 have been amended to clarify this well known point and are submitted to be consistent with practice and teachings of the present invention. No new matter is involved and the claims are submitted to be allowable.

Rejection Based on 35 USC §102

Claims 1 and 2 were rejected as fully met by the patent to Larsson, No. 4,968,068, principally Fig. 2 thereof which uses a sleeve to connect two threaded elements.. The Office Action asserts that this interconnection is a “sucker rod”, whereas it is actually a “thread coupling” for a “drill string” (see the Larsson abstract). Also the comments in the Office Action recite that Larsson includes dimensioning pin ends relative to the coupler 18’ “to provide compressional loading forces between opposing end faces...when the threaded sections are matingly inserted to preselected penetrations of the engagement members with the coupler ends...”. In Fig. 2, however, the opposing end faces 16’ and 16” of Larsson are separated by a gap δ until the threads wear down, and compression forces are thus precluded by this teaching.

As a recitation of the subject matter of claim 1, therefore, this abstract version is incorrect, and the Larsson teaching is inadequate to anticipate the inventive subject matter. Larsson teaches a “percussion drilling” combination (Col. 1, line 24) in which the spigot or threaded part of a male member fits within a sleeve up to a shoulder stop (Fig. 1, Col. 2, lines 65-69), with its end face in close but non-contacting relation (Col. 3, lines 4-5) to the internal end of the female member (bottom stop). Larsson points out that prior art constructions used shoulder stop contact and bottom stop contact

alternatively, but that he prefers shoulder stop contact because of the greater resistance to bending forces. Larsson provides no clear description of the usage of his percussive drill, but it is unmistakably a jack hammer-type drill device, as shown by his teaching and other patents in the same art. In this type of drill, impact loads resulting from repeated percussions must be absorbed by a resistant surface or stop, of either the “shoulder-type” or the “bottom-type”, or both. Maximizing cyclic life is not mentioned or important to Larsson and not shown or suggested by him.

As is pointed out in the present specification, in contrast, a sucker rod apparatus faces a totally different problem, whether used with a horse head-type of pump or a rotary or progressive pump. The horse head pump, for example, can operate over millions of cycles while alternating between tension loads and compressive loads. If there are minor displacements between the coupled parts of a sucker rod string initially or during the life of the connection, this can lead to fatigue failures. Applicant’s concept, for dimensioning parts so that they firmly and intimately unite under prestress, is not in any way shown or selected by Larsson. In the percussive drill, and in Larsson particularly, the percussive impact is taken up by the shoulder stop and as Larsson points out, there must be an initial gap, small though it may be, in the end stop region. As the impacts accumulate, wear occurs in the threaded region and the end stop gap disappears until ultimately bottom contact is made as well.

In the Office Action recitation of the alleged contents of claim 1, on page 4 of the Office Action, it is said that the length dimensions of Larsson (Fig. 2) are selected “to provide compressional loading between opposing end faces”. This is not correct, and cannot be read into the brief explanation of Fig. 1 of Larsson. Larsson says nothing whatsoever about prestressing, tension or compression, but merely discloses that there

must be contact (e.g. Col. 2, line 65, Col. 3, line 22) between the opposing surfaces of the spigot and the sleeve at the shoulder end. Manifestly, Larsson cannot tolerate a further tightening, because the 1 mm initial spacing he seeks for tolerance purposes (Col. 3, line 5) will be eliminated.

The comparable Larsson spacing of two threaded members is shown between the end faces in Larsson's alternative version (Fig. 2). Thus there cannot be said to be "a pre-selected penetration in the coupler 18' based on engagement of the coupler engagement members 14 and 14' with the coupler ends 18A'".

Applicant has therefore presented a new combination meeting critical criteria for fatigue resistance and strength in a sucker rod system, while Larsson provides no teaching that is applicable to a sucker rod system, or to what is claimed. The most that can be said about Larsson is that contact is made between the shoulder and the end of the sleeve in his Fig 2 system, but there is no penetration past that point nor any preselected penetration in the coupler past engagement of the coupler engagement members with the coupler ends (claim 1 lines 9 and 10). Nor are there "compressional loading forces between opposing end faces of the pin ends" which are inserted from opposite sides. This feature is set out clearly in claim 1, which is accordingly submitted to be allowable. The recitation of general legal principles on p. 5 of the Office action cannot justify stretching of the teaching of Larsson to include what he does not teach as to a fundamentally different application or to restrict what is specifically claimed by applicant.

Claim 2, dependent from claim 1, was also rejected under §102 on the basis of Larsson, but here again the recitation is to a fundamentally different structure, purpose and combination including "a chosen displacement beyond insertion to the hand tight

plane, whereby lengths of the pin end sections from the end faces are in compression and co-extensive lengths of the coupler are in tension and the mating threads lock under prestress to inhibit relative movement”. These mechanical forces and effects co-act in forming the unitary multipiece body of the present inventive connection. In contrast Larsson says nothing about “beyond insertion to the hand tight plane” or placing the pin end sections “in compression” with “co-extensive length of the coupler...in tension”. The claimed combination contributes to locking the mating threads “under prestress to inhibit relative movement” which is meaningful in maximizing the number of duty cycles which the sucker rod connection can withstand. Claim 2 accordingly is also resubmitted as allowable, whether under the standards of §102 as to full anticipation or §103 as to obviousness.

Claims 5 and 15 were rejected under 35 USC §103 as obvious, in view of the teachings of additional references to Reding et al, Watson et al and Carlson et al, the meaningful combination of which references is also respectfully traversed. The use of intervening elements between the end faces of two adjacent rods within a sleeve does not suggest the co-action of elements and forces so as to create tension in the sleeve in its central region, compression of both end faces against the torque washer in the central region, and compression of the pin and shoulder against the sleeve end faces at each end of the coupling. It is evident from the above that Larsson presupposes and requires the existence of an initial 1 mm gap. The effectiveness of such a gap would be totally obviated by the inclusion of a central element, whether the type taught by Redding et al, Watson et al or Carlson et al. Note, however, that these secondary references are essentially unlike each other and also different from the percussive drill element of

Larsson. Claims 5 and 15 are therefore submitted to distinguish patentably on the basis of parent claim 1 alone, as well as their specific contents.

Claims 29 and 30 have been allowed, but claims 29 and 30 have been edited without new matter in two minor respects for better form. The indication of the reasons for allowability have been reviewed and are satisfactory to applicant. The additional art cited but not applied has been rejected and is not considered to apply.

In the light of the above considerations, rejected claims 1, 2, 5, 15, 18 and 28 are resubmitted, as amended.

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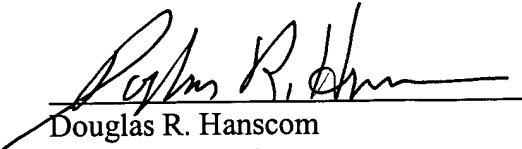
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